

WHAT IS CLAIMED IS:

1. A multi-part intraocular lens (IOL) comprising:
 - an optic;
 - 5 a haptic comprising:
 - at least one "V"-shaped element having a pair of legs and a square or rounded corner; and
 - at least two contact points for the eye each located on one of said legs or one of said corners; and
 - 10 an attachment for the optic onto the haptic.
2. The multi-part intraocular lens of Claim 1, comprising two "V"-shaped elements.
3. The multi-part intraocular lens of Claim 1, wherein said "V"-shaped element is straight.
- 15 4. The multi-part intraocular lens of Claim 1, wherein said "V"-shaped element is rounded.
5. The multi-part intraocular lens of Claim 1, wherein said attachment comprises a cleat and an eyelet wherein said eyelet comprises an eyelet aperture.
6. The multi-part intraocular lens of Claim 5, wherein said cleat is a part of
- 20 said haptic.
7. The multi-part intraocular lens of Claim 5, wherein said eyelet is a part of said lens.
8. The multi-part intraocular lens of Claim 5, wherein said cleat is chamfered.
- 25 9. The multi-part intraocular lens of Claim 5, wherein said eyelet is offset or angled to hook under said cleat.
10. The multi-part intraocular lens of Claim 5, wherein said eyelet is a filament.
11. The multi-part intraocular lens of Claim 5, wherein said eyelet is
- 30 fabricated separately and attached to the lens.
12. The multi-part intraocular lens of Claim 5, wherein said eyelet is tinted.

13. The multi-part intraocular lens of Claim 5, wherein said cleat is fabricated separately and attached to the haptic.

14. The multi-part intraocular lens of Claim 5, wherein said cleat is tinted.

15. The multi-part intraocular lens of Claim 5, wherein said eyelet aperture has a diameter larger than the diameter of the cleat to allow for normal eye movements.

16. The multi-part intraocular lens of claim 6, wherein said haptic comprises at least two cleats.

17. The multipart intraocular lens of Claim 8, wherein said lens comprises at least two eyelets.

18. The multipart intraocular lens of Claim 17, wherein said lens comprises multiple eyelets to allow for rotation of the lens.

19. The multi-part intraocular lens of Claim 1, wherein there are two or more attachments.

20. The multi-part intraocular lens of Claim 1, wherein the two or more attachments are asymmetrical.

21. The multi-part intraocular lens of Claim 1, wherein at least one of said legs of at least one of said "V"-shaped elements is sufficiently flexible to move the other one of said legs of said at least one of said "V"-shaped elements..

22. The intraocular lens of Claim 1, wherein said haptic is composed of a material selected from the group consisting of: polyimide, polyetheretherketone, polycarbonate, polymethylpentene, polyphenylsulfone, polymethylmethacrylate (PMMA), polypropylene, polyvinylidene fluoride, polysulfone, and polyethersulfone.

23. The intraocular lens of Claim 22, wherein said polyimide is KAPTON.

24. The intraocular lens of Claim 22, wherein said haptic is composed of polymethylmethacrylate (PMMA).

25. The intraocular lens of Claim 22, wherein said haptic has a modulus of elasticity of about 450,000 psi/inch.

26. The intraocular lens of Claim 1, wherein said haptic has a modulus of elasticity of 100,000 to 500,000 psi.

27. The intraocular lens of Claim 1, wherein said haptic is less than about 0.01 inches thick.

28. The intraocular lens of Claim 1, wherein said haptic is machine-formed.
29. The intraocular lens of Claim 1, wherein said haptic is laser cut.
30. The intraocular lens of Claim 1, wherein said haptic is molded.
31. The intraocular lens of Claim 1, wherein said haptic has a hardness of
5 about 90 to 95 shore M.

32. The intraocular lens of Claim 1, wherein said haptic is sized for a particular eye, and wherein one of said legs of said haptic is larger than the space within said particular eye.

33. The intraocular lens of Claim 32, wherein the diameter of said haptic is
10 up to about 1 mm greater than that of said particular eye.

34. The intraocular lens of Claim 32, wherein the diameter of said haptic is between about 0.3 and 0.6 mm greater than that of said particular eye.

35. The intraocular lens of Claim 32, wherein the diameter of said haptic is between about 0.4 and 0.5 mm greater than that of said particular eye.

36. The intraocular lens of Claim 1, wherein said optic is selected from the
15 group consisting of a refractive lens, a monofocal lens, a toric lens, an aspheric lens, a bifocal lens, an interference lens, a positive lens, a negative lens, a standard power monofocal lens, a multi-focal spheric lens, a multiple optic lens, an interference lens, a thin lens, a radially non-symmetrical lens, a laterally non-symmetrical lens and a defocusing lens.
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37. The intraocular lens of Claim 1, wherein said optic may be inserted into the anterior or posterior chamber of the eye.

38. The intraocular lens of Claim 1, wherein the entire length of the haptic is available for flexure.

25 39. A multi-part intraocular lens, comprising:
a haptic with at least two "V" shaped elements;
a separate optic; and
an attachment for said optic which permits said optic to be attached to said haptic within the eye.

30 40. The multi-part intraocular lens of Claim 39, wherein at least one of said "V"-shaped elements is rounded.

41. The multi-part intraocular lens of Claim 39, wherein at least one of said "V"-shaped elements is straight.

42. The multi-part intraocular lens of Claim 39, wherein said attachment comprises a cleat and an eyelet wherein said eyelet comprises an eyelet aperture.

5 43. The multi-part intraocular lens of Claim 42, wherein said cleat is a part of said haptic.

44. The multi-part intraocular lens of Claim 42, wherein said eyelet is a part of said lens.

10 45. The multi-part intraocular lens of Claim 42, wherein said cleat is chamfered.

46. The multi-part intraocular lens of Claim 42, wherein said eyelet is offset or angled to hook under said cleat.

47. The multi-part intraocular lens of Claim 42, wherein said eyelet is a filament.

15 48. The multi-part intraocular lens of Claim 42, wherein said eyelet is fabricated separately and attached to the lens.

49. The multi-part intraocular lens of Claim 42, wherein said eyelet is tinted.

50. The multi-part intraocular lens of Claim 42, wherein said cleat is fabricated separately and attached to the haptic.

20 51. The multi-part intraocular lens of Claim 42, wherein said cleat is tinted.

52. The multi-part intraocular lens of Claim 42, wherein said eyelet aperture has a diameter larger than the diameter of the cleat to allow for normal eye movements.

53. The multi-part intraocular lens of claim 43, wherein said haptic comprises at least two cleats.

25 54. The multipart intraocular lens of Claim 45, wherein said lens comprises at least two eyelets.

55. The multipart intraocular lens of Claim 54, wherein said lens comprises multiple eyelets to allow for rotation of the lens.

30 56. The multi-part intraocular lens of Claim 42, wherein there are two or more attachments.

57. The multi-part intraocular lens of Claim 42, wherein the two or more attachments are asymmetrical.

58. The multi-part intraocular lens of Claim 42, wherein at least one of said legs of at least one of said "V"-shaped elements is sufficiently flexible to move the other one of said legs of said at least one of said "V"-shaped elements..

59. The intraocular lens of Claim 42, wherein said haptic is composed of a material selected from the group consisting of: polyimide, polyetheretherketone, polycarbonate, polymethylpentene, polyphenylsulfone, polymethylmethacrylate (PMMA), polypropylene, polyvinylidene fluoride, polysulfone, and polyethersulfone.

60. The intraocular lens of Claim 59, wherein said polyimide is KAPTON.

61. The intraocular lens of Claim 59, wherein said haptic is composed of polymethylmethacrylate (PMMA).

62. The intraocular lens of Claim 59, wherein said haptic has a modulus of elasticity of about 450,000 psi/inch.

63. The intraocular lens of Claim 42, wherein said haptic has a modulus of elasticity of 100,000 to 500,000 psi.

64. The intraocular lens of Claim 42, wherein said haptic is less than about 0.01 inches thick.

65. The intraocular lens of Claim 42, wherein said haptic is machine-formed.

66. The intraocular lens of Claim 42, wherein said haptic is laser cut.

67. The intraocular lens of Claim 42, wherein said haptic is molded.

68. The intraocular lens of Claim 42, wherein said haptic has a hardness of about 90 to 95 shore M.

69. The intraocular lens of Claim 42, wherein said haptic is sized for a particular eye, and wherein one of said legs of said haptic is larger than the space within said particular eye.

70. The intraocular lens of Claim 69, wherein the diameter of said haptic is up to about 1 mm greater than that of said particular eye.

71. The intraocular lens of Claim 69, wherein the diameter of said haptic is between about 0.3 and 0.6 mm greater than that of said particular eye.

72. The intraocular lens of Claim 69, wherein the diameter of said haptic is between about 0.4 and 0.5 mm greater than that of said particular eye.

73. The intraocular lens of Claim 42, wherein said optic is selected from the group consisting of a refractive lens, a monofocal lens, a toric lens, an aspheric lens, a bifocal lens, an interference lens, a positive lens, a negative lens, a standard power monofocal lens, a multi-focal spheric lens, a multiple optic lens, an interference lens, a thin lens, a radially non-symmetrical lens, a laterally non-symmetrical lens and a defocusing lens.

74. The intraocular lens of Claim 42, wherein said optic may be inserted into the anterior or posterior chamber of the eye.

75. A method for introducing an intraocular lens into a very small incision in an eye, comprising:

inserting the haptic of Claim 1 into the eye;

inserting the optic of Claim 1 into the eye separate from said haptic; and

attaching said optic onto said haptic within the eye using the attachment of Claim 1.

76. The method of Claim 75 wherein said insertion of said haptic into the eye is by flexing or bending said legs of said "V"-shaped elements toward each other.

77. The method of Claim 75, wherein said haptic is inserted first.

78. The method of Claim 75, wherein said optic is inserted first.

79. The method of Claim 75, further comprising removing said optic and replacing it with a different optic.

80. The method of Claim 75, further comprising removing said optic and repositioning it within the eye.

81. The method of Claim 80, wherein said repositioning comprises rotational repositioning for correction of astigmatism.

82. The method of Claim 81, wherein said repositioning comprises turning the optic over.

83. The method of Claim 75, further comprising adding a second optic.

84. The method of Claim 75, further comprising removing said haptic and replacing it with a different haptic.

85. The method of Claim 75, further comprising removing said haptic and repositioning it within the eye.

86. The method of Claim 75, wherein said optic is formed of a relatively lower modulus material than said haptic.

5 87. The method of Claim 75, wherein said optic is attached to said haptic with a stretchable attachment.

88. The method of Claim 75, further comprising partially assembling said optic onto said haptic during insertion.

10 89. The method of Claim 74, further comprising assembling said optic onto said haptic prior to insertion.

90. A method for introducing an intraocular lens into a very small incision in an eye, comprising:

inserting the haptic of Claim 39 into the eye;

inserting the optic of Claim 39 into the eye separate from said haptic;

15 and

attaching said optic onto said haptic within the eye using the attachment of Claim 39.

91. The method of Claim 90 wherein said insertion of said haptic into the eye is by flexing or bending said legs of said "V"-shaped elements toward each other.

20 92. The method of Claim 90, wherein said haptic is inserted first.

93. The method of Claim 90, wherein said optic is inserted first.

94. The method of Claim 90, further comprising removing said optic and replacing it with a different optic.

25 95. The method of Claim 90, further comprising removing said optic and repositioning it within the eye.

96. The method of Claim 95, wherein said repositioning comprises rotational repositioning for correction of astigmatism.

97. The method of Claim 95, wherein said repositioning comprises turning the optic over.

30 98. The method of Claim 90, further comprising adding a second optic.

99. The method of Claim 90, further comprising removing said haptic and replacing it with a different haptic.

100. The method of Claim 90, further comprising removing said haptic and repositioning it within the eye.

5 101. The method of Claim 90, wherein said optic is formed of a relatively lower modulus material than said haptic.

102. The method of Claim 90, wherein said optic is attached to said haptic with a stretchable attachment.

10 103. The method of Claim 90, further comprising partially assembling said optic onto said haptic during insertion.

104. The method of Claim 90, further comprising assembling said optic onto said haptic prior to insertion.

105. A haptic for an intraocular lens, comprising:

15 a first "V" shaped portion, having a maximum interior angle less than 90° and two arms; and

a second "V" shaped portion, having a maximum interior angle less than 90° and two arms, one of said arms joined to said first "V" shaped portion at said interior angle of said first "V" shape.

20 106. The haptic of Claim 105 wherein at least one of said "V"-shaped portions are rounded.

107. The haptic of Claim 105, wherein at least one of said "V"-shaped portions are straight.

108. The haptic of Claim 105, further comprising at least one cleat for attachment to an optic.

25 109. The haptic of Claim 108 wherein said cleat is chamfered.

110. The haptic of Claim 108 wherein said cleat is fabricated separately and attached to the haptic.

111. The haptic of Claim 108, wherein said cleat is tinted.

30 112. The haptic of Claim 108, wherein said haptic comprises two or more cleats.

113. The haptic of Claim 109, wherein said arms of said at least one of said "V"-shaped elements is sufficiently flexible to move the other one of said arms of said at least one "V" shaped elements.

114. The haptic of Claim 109, wherein said haptic is composed of a material selected from the group consisting of: polyimide, polyetheretherketone, polycarbonate, polymethylpentene, polyphenylsulfone, polymethylmethacrylate (PMMA), polypropylene, polyvinylidene fluoride, polysulfone, and polyethersulfone.

115. The haptic of Claim 114, wherein said polyimide is KAPTON.

116. The haptic of Claim 114, wherein said haptic is composed of polymethylmethacrylate (PMMA).

117. The haptic of Claim 109, wherein said haptic has a modulus of elasticity of about 450,000 psi/inch.

118. The haptic of Claim 109, wherein said haptic has a modulus of elasticity of 100,000 to 500,000 psi.

119. The haptic of Claim 109, wherein said haptic is less than about 0.01 inches thick.

120. The haptic of Claim 109, wherein said haptic is machine-formed.

121. The haptic of Claim 109, wherein said haptic is laser cut.

122. The haptic of Claim 109, wherein said haptic is molded.

123. The haptic of Claim 109, wherein said haptic has a hardness of about 90 to 95 shore M.

124. The haptic of Claim 109, wherein said haptic is sized for a particular eye, and wherein one of said legs of said haptic is larger than the space within said particular eye.

125. The haptic of Claim 124, wherein the diameter of said haptic is up to about 1 mm greater than that of said particular eye.

126. The haptic of Claim 124, wherein the diameter of said haptic is between about 0.3 and 0.6 mm greater than that of said particular eye.

127. The haptic of Claim 124, wherein the diameter of said haptic is between about 0.4 and 0.5 mm greater than that of said particular eye.

128. The haptic of Claim 109, further comprising an eyelet.

129. A method of inserting a haptic into a patient's eye, comprising:
threading the haptic of Claim 109 through an incision smaller than 2.0 mm into
said eye, by bending the arms of two "V" shaped structures onto each other as they pass
through said incision.
- 5 130. A method of inserting a haptic into a patient's eye, comprising:
threading said haptic through an incision smaller than 2.0 mm into said eye, by
bending the arms of two "V" shaped structures onto each other as they pass through said
incision.
- 10 131. The method of Claim 130, wherein at least one of said "V"-shaped
structures is rounded.
132. The method of Claim 130, wherein at least one of said "V"-shaped
structures is straight.
133. The method of Claim 130, wherein said method takes less than about 10
minutes.
- 15 134. The method of Claim 130, wherein said method takes less than about 5
minutes.
135. The method of Claim 130, wherein said method takes less than about 2
minutes.
- 20 136. A method for introducing an intraocular lens haptic having first and
second "V"-shaped elements into a very small incision in an eye, comprising:
flexing each arm of said first "V"-shaped element of said haptic next to
or over each other and inserting said first "V"-shaped element into the eye; and
flexing each arm of said second "V"-shaped element of said haptic next
to or over each other and inserting said second "V"-shaped element into the eye.
- 25 137. The method of Claim 136, wherein said first "V"-shaped elements is
rounded.
138. The method of Claim 136, wherein said second "V"-shaped element is
rounded.
- 30 139. The method of Claim 136, wherein said first "V"-shaped element is
straight.

140. The method of Claims 136, wherein said second "V"-shaped element is straight.

141. The method of Claim 136 wherein said "V"-shaped elements include plate-type haptics.

5 142. A method for introducing an intraocular lens haptic having first and second "V"-shaped elements into a very small incision in an eye, comprising:

flexing each arm of said first "V"-shaped element of said haptic next to or over each other and inserting said first "V"-shaped element into the eye; and

10 manipulating without bending said second "V"-shaped element into the eye.

143. The method of Claim 142, wherein said first "V"-shaped elements is rounded.

144. The method of Claim 142, wherein said second "V"-shaped element is rounded.

15 145. The method of Claim 142, wherein said first "V"-shaped element is straight.

146. The method of Claims 142, wherein said second "V"-shaped element is straight.

20 147. The method of Claim 142 wherein said "V"-shaped elements include plate-type haptics.

148. A haptic for supporting an intraocular lens in an eye, and for insertion into said eye through a small incision, comprising:

25 a pair of arms, connected at one end to form a "V"-shape, at least one of said arms sufficiently flexible to permit said small incision to squeeze said pair of arms toward one another as said haptic is inserted through said small incision.

149. The haptic of Claim 148, wherein said "V" shape is straight.

150. The haptic of Claim 148, wherein said "V" shape is rounded.

151. The haptic of Claim 148, further comprising at least one cleat for attachment to an optic.

30 152. The haptic of Claim 148 wherein said cleat is chamfered.

153. The haptic of Claim 148 wherein said cleat is fabricated separately and attached to the haptic.

154. The haptic of Claim 148, wherein said cleat is tinted.

5 155. The haptic of Claim 148, wherein said haptic comprises two or more cleats.

156. The haptic of Claim 148, wherein said arms of said at least one of said "V"-shaped elements is sufficiently flexible to move the other one of said arms of said at least one "V" shaped elements.

10 157. The haptic of Claim 148, wherein said haptic is composed of a material selected from the group consisting of: polyimide, polyetheretherketone, polycarbonate, polymethylpentene, polyphenylsulfone, polymethylmethacrylate (PMMA), polypropylene, polyvinylidene fluoride, polysulfone, and polyethersulfone.

158. The haptic of Claim 157, wherein said polyimide is KAPTON.

15 159. The haptic of Claim 157, wherein said haptic is composed of polymethylmethacrylate (PMMA).

160. The haptic of Claim 150, wherein said haptic has a modulus of elasticity of about 450,000 psi/inch.

161. The haptic of Claim 149, wherein said haptic has a modulus of elasticity of 100,000 to 500,000 psi.

20 162. The haptic of Claim 149, wherein said haptic is less than about 0.01 inches thick.

163. The haptic of Claim 149, wherein said haptic is machine-formed.

164. The haptic of Claim 149, wherein said haptic is laser cut.

165. The haptic of Claim 149, wherein said haptic is molded.

25 166. The haptic of Claim 149, wherein said haptic has a hardness of about 90 to 95 shore M.

167. The haptic of Claim 149, wherein said haptic is sized for a particular eye, and wherein one of said legs of said haptic is larger than the space within said particular eye.

30 168. The haptic of Claim 167, wherein the diameter of said haptic is up to about 1 mm greater than that of said particular eye.

169. The haptic of Claim 167, wherein the diameter of said haptic is between about 0.3 and 0.6 mm greater than that of said particular eye.

170. The haptic of Claim 167, wherein the diameter of said haptic is between about 0.4 and 0.5 mm greater than that of said particular eye.

5 171. The haptic of Claim 149, further comprising an eyelet.

172. A haptic for supporting an intraocular lens in an eye, and for insertion into said eye through a small incision, comprising:

a connected pair of V-shaped elements, aligned in the same direction along the length of said haptic.

10 173. The haptic of Claim 172, wherein at least one of said V-shaped elements is rounded.

174. The haptic of Claim 172, wherein at least one of said V-shaped elements is square.

15 175. The haptic of Claim 172, further comprising at least one cleat for attachment to an optic.

176. The haptic of Claim 172 wherein said cleat is chamfered.

177. The haptic of Claim 172 wherein said cleat is fabricated separately and attached to the haptic.

178. The haptic of Claim 172, wherein said cleat is tinted.

20 179. The haptic of Claim 172, wherein said haptic comprises two or more cleats.

180. The haptic of Claim 172, wherein said arms of said at least one of said "V"-shaped elements is sufficiently flexible to move the other one of said arms of said at least one "V" shaped elements.

25 181. The haptic of Claim 172, wherein said haptic is composed of a material selected from the group consisting of: polyimide, polyetheretherketone, polycarbonate, polymethylpentene, polyphenylsulfone, polymethylmethacrylate (PMMA), polypropylene, polyvinylidene fluoride, polysulfone, and polyethersulfone.

182. The haptic of Claim 181, wherein said polyimide is KAPTON.

30 183. The haptic of Claim 181, wherein said haptic is composed of polymethylmethacrylate (PMMA).

184. The haptic of Claim 172, wherein said haptic has a modulus of elasticity of about 450,000 psi/inch.

185. The haptic of Claim 172, wherein said haptic has a modulus of elasticity of 100,000 to 500,000 psi.

5 186. The haptic of Claim 172, wherein said haptic is less than about 0.01 inches thick.

187. The haptic of Claim 172, wherein said haptic is machine-formed.

188. The haptic of Claim 172, wherein said haptic is laser cut.

189. The haptic of Claim 172, wherein said haptic is molded.

10 190. The haptic of Claim 172, wherein said haptic has a hardness of about 90 to 95 shore M.

191. The haptic of Claim 172, wherein said haptic is sized for a particular eye, and wherein one of said legs of said haptic is larger than the space within said particular eye.

15 192. The haptic of Claim 191, wherein the diameter of said haptic is up to about 1 mm greater than that of said particular eye.

193. The haptic of Claim 191, wherein the diameter of said haptic is between about 0.3 and 0.6 mm greater than that of said particular eye.

20 194. The haptic of Claim 191, wherein the diameter of said haptic is between about 0.4 and 0.5 mm greater than that of said particular eye.

195. The haptic of Claim 172, further comprising an eyelet.

196. A haptic for supporting an intraocular lens in an eye, and for insertion into said eye through a small incision, comprising:

25 a connected pair of straight or rounded V-shaped elements, aligned in opposite directions along the length of said haptic.

197. The haptic of Claim 196, wherein at least one of said V-shaped elements is rounded.

198. The haptic of Claim 196, wherein at least one of said V-shaped elements is square.

30 199. The haptic of Claim 196, further comprising at least one cleat for attachment to an optic.

200. The haptic of Claim 196, wherein said cleat is chamfered.
201. The haptic of Claim 196, wherein said cleat is fabricated separately and attached to the haptic.
202. The haptic of Claim 196, wherein said cleat is tinted.
- 5 203. The haptic of Claim 196, wherein said haptic comprises two or more cleats.
204. The haptic of Claim 196, wherein said arms of said at least one of said "V"-shaped elements is sufficiently flexible to move the other one of said arms of said at least one "V" shaped elements.
- 10 205. The haptic of Claim 196, wherein said haptic is composed of a material selected from the group consisting of: polyimide, polyetheretherketone, polycarbonate, polymethylpentene, polyphenylsulfone, polymethylmethacrylate (PMMA), polypropylene, polyvinylidene fluoride, polysulfone, and polyethersulfone.
206. The haptic of Claim 205, wherein said polyimide is KAPTON.
- 15 207. The haptic of Claim 205, wherein said haptic is composed of polymethylmethacrylate (PMMA).
208. The haptic of Claim 196, wherein said haptic has a modulus of elasticity of about 450,000 psi/inch.
209. The haptic of Claim 196, wherein said haptic has a modulus of elasticity
20 of 100,000 to 500,000 psi.
210. The haptic of Claim 196, wherein said haptic is less than about 0.01 inches thick.
211. The haptic of Claim 196, wherein said haptic is machine-formed.
212. The haptic of Claim 196, wherein said haptic is laser cut.
- 25 213. The haptic of Claim 196, wherein said haptic is molded.
214. The haptic of Claim 196, wherein said haptic has a hardness of about 90 to 95 shore M.
215. The haptic of Claim 196, wherein said haptic is sized for a particular eye, and wherein one of said legs of said haptic is larger than the space within said particular
30 eye.

216. The haptic of Claim 215, wherein the diameter of said haptic is up to about 1 mm greater than that of said particular eye.

217. The haptic of Claim 215, wherein the diameter of said haptic is between about 0.3 and 0.6 mm greater than that of said particular eye.

5 218. The haptic of Claim 215, wherein the diameter of said haptic is between about 0.4 and 0.5 mm greater than that of said particular eye.

219. The haptic of Claim 196, further comprising an eyelet.